

Army Technology Transfer Awards

Scientists and engineers from the U.S. Army Research Laboratory (ARL) and the U.S. Army Aviation and Missile Command, both major subordinate commands of the U.S. Army Materiel Command, won FY00 Federal Laboratory Consortium (FLC) Awards for Excellence in Technology Transfer. Winners were honored at the FLC Annual Meeting held in Charleston, SC, last year.

The FLC is a congressionally chartered network of federal laboratories designed to promote and strengthen technology transfer nationwide. The FLC established this annual award program to recognize individuals from federal laboratories as well as commercial sector partners who have done outstanding work in transferring technology to the commercial marketplace.

Nominations are submitted by the laboratories and are judged by a panel of technology transfer experts from industry, state and local governments, academia, and the federal laboratory system.

The award criteria are as follows:

- An individual or team of individuals has demonstrated uncommon creativity and initiative in the transfer of technology.
- The benefits to industry, state and local governments, and/or to the general public are significant.
- The achievements are recent.

Recipients of Awards for Excellence in Technology Transfer and highlights of their achievements follow.

The LASFORM Rapid Prototyping System. A team of engineers from ARL and AeroMet Corp. of Eden Prairie, MN, successfully transferred a new rapid prototyping technology—the LASFORM laser-forming system. This technology, which has DOD and commercial aerospace applications, is a flexible, one-step process whereby a precursor material (usually a powdered metal introduced into a laser beam) is deposited as molten droplets onto a metallic substrate located beneath the focused beam. Prompted by computer instruction, a multiaxis positioning system drives the substrate in motions reproducing a horizontal layer, or slice, of the part as described by a computer-aided design model. After the initial layer has been deposited and fused to the substrate, the beam and powder delivery subsystem are indexed in the vertical direction by an amount equal to the layer thickness. A layer-upon-layer deposition sequence is then repeated until the desired density is

achieved. Although other rapid prototyping processes are available, none has the size capability of LASFORM, and the properties of its prototyped parts do not have sufficient strength or toughness to be used in the field.

This transfer effort is being executed through a cooperative research and development agreement (CRADA) between ARL and AeroMet, a subsidiary of MTS Systems Corp. AeroMet was founded in 1997 for the sole purpose of commercializing LASFORM, as well as capitalizing on ARL's vision and direction in rapid prototyping. To that end, AeroMet installed and is now operating the large-scale laser-forming system in its 16,000-square-foot facility.

LASFORM provides many benefits for AeroMet, which now can produce less costly aerospace parts for both industry and DOD. Other users such as the Navy are seeing the cost of parts decrease by as much as \$50 million.

Digital Eye Screening Refractive photography has been used to diagnose eye disease for years. The problem with this process is that the quality of a picture is uncertain until the film is developed. If the film is unsatisfactory, another photo session has to be scheduled with the patient. Also, the entire process—from photo session to analysis—can take several weeks.

In 1997, Vision Partners of Memphis, TN, contacted the U.S. Army Aviation and Missile Command's Research, Development and Engineering Center (AMRDEC) to investigate automating and improving the refractive process using advanced imaging and signaling processing. Wayne Davenport, an AMRDEC expert in digital imaging and optics, who is also knowledgeable in the mechanics of the human eye, immediately went to work on the problem.

Through a CRADA between Vision Partners and AMRDEC, Davenport designed a small, light system that provides real-time feedback and increased accuracy versus standard 35mm systems. Called the iScreen, the device is capable of screening both children and adults in a matter of seconds for eye diseases such as amblyopia, strabismus, and cataracts; and refractive problems such as myopia, hyperopia, and astigmatism.

Once the iScreen was developed, Davenport constructed five of the photo-screening devices himself, eventually transitioning the construction process to SPARTA Inc. of Huntsville, AL. A patent is expected to be issued for the iScreen sometime this year.

Not only will children who undergo mandatory screening by pediatricians immediately benefit from this technology, the general public will benefit as well because children will be able to be screened through

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state-run programs that will make the process more affordable.

Acoustic Physiological Monitoring Sensor. The acoustic physiological monitoring sensor, developed by Michael Scanlon of ARL, is a breakthrough technology with the potential to save many lives. Marketed first as the Sudden Infant Death Syndrome Monitor and Stimulator (SIDSMAS), the sensor employs a fluid-filled bladder with a hydrophone inside that matches the acoustic impedance of an infant in contact with the pad containing the sensor. By removing impedance mismatches, excellent acoustic coupling of heart and breathing sounds—as well as vocalizations and movement noises—is achieved. The sensor can be attached to beds, wheelchairs, or other body-contacting equipment. Smaller versions of the sensor can be body-worn by sol-

diers, firefighters, or police, or be used for health monitoring of individuals. The sensor's transmitter and alert functions allow personnel in nurseries, hospitals, day-care centers, and private homes to continuously assess the health and performance of individuals. A single acoustic sensor can collect information concerning heart, lungs, and digestive tract functions, or detect changes in voice or sleep patterns, motor activity, and mobility. Surgeons and research physiologists have commended the data Scanlon collected and processed for this technology. Many in the field believe the technology will be the basis for next-generation stethoscopes and long-term health monitoring.

The preceding article was submitted by James K. Wanko, the Army Domestic Technology Transfer Program Manager at the U.S. Army Research Laboratory, Adelphi, MD.

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